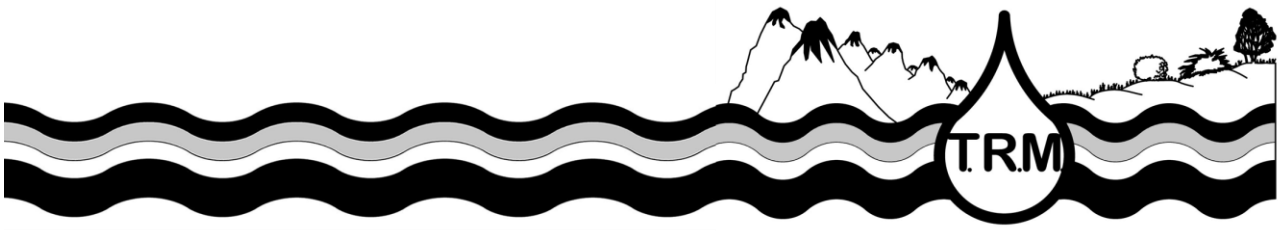
The River Mile

Pre-Visit Lessons

Contents

Note: the Stewardship lessons are a condensed version from the Stewardship PowerPoint



The River Mile Essential Question

Subject: Essential questions, questioning techniques,
Duration: 10 -30 minutes
Location: School Site/classroom
When: Pre-visit
Grade: 3-12th

Objectives:
Students will be able to: a) identify The River Mile's Essential Question, b) describe and identify what a watershed is, c) discuss what simultaneously use and protect means, d) list ways watersheds are used and how we protect them, e) identify parts and their function in a simple watershed system.

Materials:

Procedure:

The overall guiding question for all interaction with The River Mile is:

- ***How do we simultaneously use and protect our watershed?***

This question guides what we do, (e.g., sharing with others, library research, etc.)

Because we are interested in, and taking, a systems approach to water quality monitoring and investigation ecosystem health, the following essential question guides our work:

- **How do relationships among components of an ecosystem in a watershed affect water quality?**

These questions are introduced before the first site visit and engage students in learning and exploring about: What is the difference between use and protect? What actions, events and things affect water? What is a watershed? Students will observe your site and learn about what is at your site and how components interact with each other.

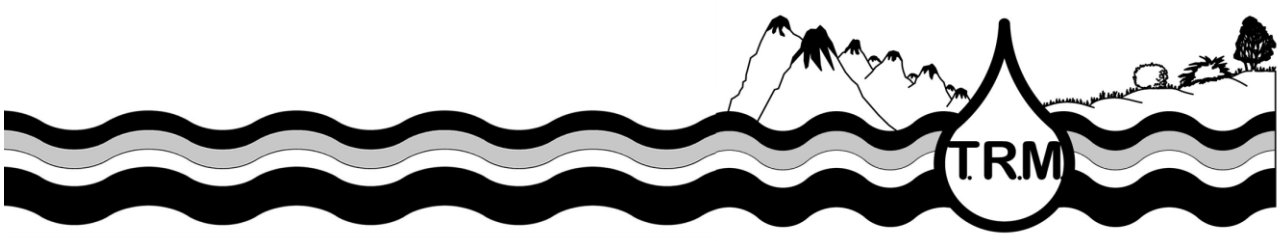
Background Information:
Essential question: builds enduring meaning, directs toward critical thinking. Can be why or why not. Constant learning. Helps focus on goals. Adds personal actions. Framework to raise more questions. Logical path of investigation. Learner centered. Allows for a lot of different outcomes. Opportunity to ask questions and transfer skills to more than one place and opportunity. Open ended. Allows for good relating with standards and teachable moments.

Procedures
With students discuss the guiding question. Help define use and protect and a watershed. What kids of events, actions and things are in our watershed? Where is our watershed? Is it small or large? Is it part of another watershed?

Then discuss the essential question, what it means to them. Present the essential question again and ask about what happens in their watershed, and ask how do those events and activities affect the water in your watershed? Do they only affect your watershed?

How do we simultaneously use and protect our watershed?

- What is a watershed?
- What is the difference between use and protect?
- What actions, events and things happen in your watershed?



How do relationships among components of an ecosystem in a watershed affect water quality?

- What are the components?
  What interactions are there?

Mind Maps

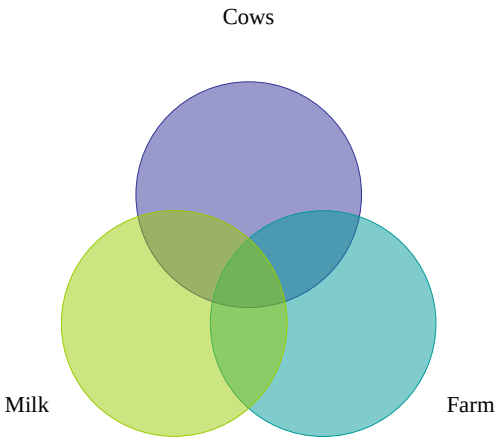
Subject: watersheds, connections,
Duration: 30-60 minutes
Location: School Site/classroom
When: Pre- and post visit
Grade: All

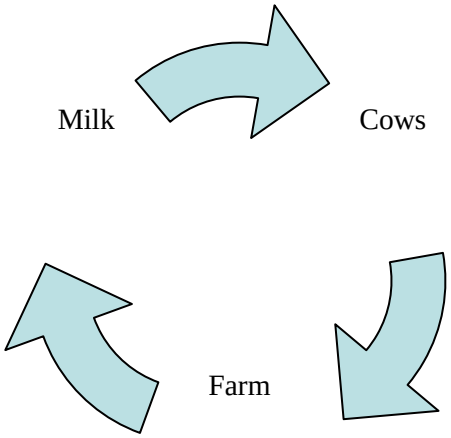
Objectives:
Students will be able to: a) ven diagram watershed related words

Materials: paper, flipchart or board

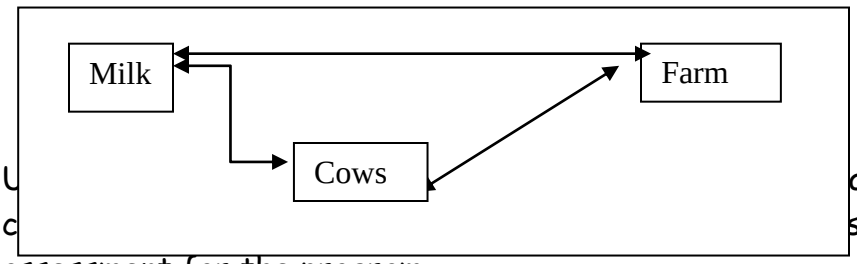
Procedure:

1) Teach students how to do mind maps
   a. Show several ways of doing them
   b. Do a few practice ones as a group





2) U ap showing the
c sessment and post
assessment for the program.



Sun	Clouds	Rain
River	Plants	Animals
Soil	Mountains	

3) Give students 15 minutes to create all the connections they can. They must be able to explain their diagram. Have students turn them in. Make copies of them and return them to the students.
4) During the next class period have students present and explain their mind map. Discuss the Earth's water cycle (also referred to as the hydrologic cycle).

Post Visit

1) Using the following words have students create a mind map showing the connections between the words. This is used as the post-assessment to see what has changed in their connections.

Sun	Clouds	Rain
River	Plants	Animals
Soil	Mountains	

2) Give students 15 minutes to create all the connections they can. They must be able to explain their diagram.
3) Have students turn them in. Make copies of them and return them to the students.
4) During the next class period have students present and explain their mind map and discuss what they have learned about these connections. What changes in their connections do they see from before their site visit to now? What questions do they have about the water cycle at their assigned river mile

Journals and Science Notebooks

Subject: record keeping, journals, science notebooks
Duration: 30-90 minutes
Location: School Site/classroom
When: Pre-visit
Grade: 3-12th

Objectives:
Students will be able to: a) describe the importance of journals, b) describe the difference between journals and science notebooks

Materials: notebook paper, graph paper, 3-ring binders, folders, construction paper, stapler, yarn, pencil

Procedure:
This activity may be broken into sections and completed on different days.

Discuss with students the importance of journals, how have people used them, who might need to keep records, what type of information might you keep in a journal. Scientists keep journals and records carefully in the field. A good example of journals are the journals of the Lewis and Clark Expedition. These journals are descriptive and they contain a lot of scientific information.

What type of information is necessary in a journal? There is some information that is really necessary. Have students make a list of necessary information on the board.

Have students brainstorm different types of information and ways to record things. Examples are drawings, lists, poetry, detailed descriptions, etc. Discuss descriptive language used in both expository journal writing and scientific journals/records and how descriptive language is used and how adjectives, adverbs and prepositional phrases add life to written entries.

Scientific notebooks are where you collect your data. During The River Mile students will store their data collection sheets in their science notebooks.

Students will be doing sit spots (from NatureMapping), observation exercises and data collection during their participation in The River Mile. If your school has multiple grades participating in The River Mile, consider making journals and science notebooks which can be used over their entire experience.

Have students create a journal and/or a scientific notebook.

Making Journals:
For all journals fill with at least 5-10 pages.
There are many ways of making a journal.

- File folders cut in half, 3 hole punch, cover with crinkled newspaper, then decorated. Fill with filler paper and blank paper then use yarn to close.
- Half a sheet of 8 $\frac{1}{2}$ x 11 construction paper and blank paper 4"x4". Staple the blank paper inside the construction paper near the middle so you can fold both sides in. Leave $\frac{3}{4}$" between one edge of the blank paper and the fold on one side. Overlap the two folds then staple the "top" closed leaving the sided folded with $\frac{3}{4}$" spacing outside the staple. This is where you can slide a pencil.

Science Notebooks:
Usually a 3 ring binder is best.
They need to accommodate 8 $\frac{1}{2}$ x 11 paper and allow for materials to be added during pre-visit, field study and post visit. Forms and handouts will be added during site visits as well as during classroom lessons. Place at least 5 pages of blank paper, 5 pages of lined paper and 5 pages of graph paper in each science notebook.

Now ask students and discuss with them:

- What do you see when you look?
- Is writing the only way to record what they see? What are some other ways of recording or writing about what they see? Possibilities include: poetry, expository writing, lists, drawings and artwork, etc.
- Is seeing/looking the only way to observe?
- What else can we use to learn about things around us? We actually use all of our senses.
- Are observations of big things or small things? We need to make sure to observe small things as well as the big things.

Sit Spot and Observations

Subject: Observations, record keeping, expository writing, descriptive writing
Duration: Classroom—60 minutes, 40 minutes, 20 minutes; Outdoors—40 minutes, 30 minutes. Total time: 3 hours 10 minutes
Location: School Site
When: Pre-visit
Grade: 3rd-12th

Objectives:
Students will be able to: a) identify and give an example of the 3 different types of questions, b) list what things are included in journal entries, c) describe the difference between a journal and a scientific notebook

Materials:
Each student needs **a journal** with a hard cover or clipboard so they can write wherever they are. See "Journals and Science Notebooks" for description.

Procedure:
First Observation Site Visit
This activity is preparatory to the activities which will occur on the first site visit, we include it as a pre-visit activity so that students are ready.

It is essentially a journaling activity with a twist.

Have students work independently and write about their observations of the classroom (except for the teacher or other students) in their **journal**. These observations are what they already know (not necessarily by real name or in-depth). Give them 10 minutes and then have several students report to the class.

Now ask students and discuss with them:

- What do you see when you look?
- Is writing the only way to record what they see? What are some other ways of recording or writing about what they see? Possibilities include: poetry, expository writing, lists, drawings and artwork, etc.

- Is seeing/looking the only way to observe?
- What else can we use to learn about things around us? We actually use all of our senses.
- Are observations of big things or small things? We need to make sure to observe small things as well as the big things.
- Did they include the people and their activities?
- Did they make drawings and sketches?

Do the journal 2 more times. Students may use any method they desire to record their observations in the room. Give them 10 minutes for each. First observation is of the big things, second of the small details. Have students get with a partner and share what they observed. Then ask for volunteers to share with the entire class. Check to see if they are using all their senses, a variety of recording methods and big and small things.

2) Sit Spot Outdoors

Discuss the upcoming program. Now take students outside. Spread them out about 6-10 feet apart. Give them 10 minutes and make observations. Have them get with a partner and share what they observed. Then ask for volunteers to share with the entire class.

For additional skills training in observation the following provide a variety of lessons:
"Field Investigations" available through Pacific Education Institute
"Awakening Inquiry" available from the NatureMapping Foundation
NatureMapping website
Project WET

What is Environmental Stewardship?

Subject: Stewardship

ELAR-GLE: **Component 3.2 Science, Technology, and Society**: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

3.2.4 Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.

Duration: 30–40 minutes

Location: School Site/classroom

When: Pre-visit One

Grade: 3rd-12th

Objectives: Students will be able to define steward and stewardship

Overview:

Students will:

A. Write reflectively about prior experience and knowledge of the natural environment
B. Analyze the definition of stewardship
C. Discuss the National Park Service Mission
D. Compare and contrast their experiences to the experiences of others
E. Assessment: Create an analogy, simile or metaphor that synthesizes the role of humans with environmental stewardship

Materials: Stewardship Power Point (SPP) slides 1-8, science journal

---

Procedure:

Slide #1: Ask students to brainstorm ideas about the question. "What is environmental stewardship"? Make a class list of their thoughts

Slide#2: Ask students to reflect and then write about the following questions

1. Think of a time when you were out in nature and you had a powerful experience of the beauty or were in amazed by the natural environment
2. In your science journal, write about what you saw, heard, smelled, and touched.
3. Do you remember what you were feeling and thinking, if so, write that

down also?

4. Why do you think the memory of this experience has stayed with you?

Slide #3: Ask students to write the definitions of steward and stewardship in their science journals. As a class, discuss the meanings and analyze how this definition can be applied to the "environment".

Steward: a person who manages another's property or financial affairs; one who administers anything as the agent of another or others (e.g., managing servants, purchasing food and wine, in a hotel, restaurant, ship, or airplane)

Stewardship:

1. the office, duties, and obligations of a steward
2. the conducting, supervising, or managing of something; especially the careful and responsible management of something entrusted to one's care

Slides #4 -7: Create or find the mission for the agency or organization that oversees your site. Then select students to read the mission aloud. If you are using a National Park site use the "NPS Mission and Visitors Guidelines" slide in the PowerPoing. Check for student understanding of the purpose of the guidelines for the protection of the park environment.

The National Park Service Mission **Protecting Your National Parks**

The National Park Service was established on August 25, 1916 to:

- *"...promote and regulate the use of the Federal areas known as national parks, monuments, and reservations... by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

The National Park Service: Visitor Guidelines

Be a good park visitor by obeying park regulations, including, but not limited to:

- Take nothing but photographs and memories, leave nothing behind
- Enjoy yourself and remember future visitors who will come after you hoping to enjoy these American treasures too.
- Support stewardship of the park by becoming educated about the park's natural and cultural resources.
- pick up trash (including pet waste)

- keep dogs leashed
- leave precious resources undisturbed, including artifacts
- properly dispose of fishing lines and carcasses, and
- Do not use metal detectors.

Slide #8: Culminating Assessment Activity for Lesson #1

Guide students through sharing the experiences they wrote about at the beginning of lesson #1. Each pair of students will write a simile, analogy or metaphor. Homework could be given to illustrate the analogy, simile or metaphor. These can then be posted around the classroom, or scanned into an electronic file to share on-line.

How do your experiences in nature relate to "Environmental Stewardship"?

1. Work with a partner and decide who will be A and who is B.
2. Partner B you have 2 minutes to share the story about your experience with nature. Partner A listens and does not speak.
3. When time is called, Partner A you have two minutes to tell about your experience. Partner B listens and does not speak.
4. When Partner A's time is over, discuss both of your stories and how they could relate to the idea of stewardship.
5. Together create a simile, analogy, or metaphor for environmental stewardship. (e.g., an environmental steward watches over the watershed like a hen watches over her chicks)

Definitions and Examples:

Simile: a figure of speech comparing two unlike things that is often introduced by *like*, *as*, or than (as in *cheeks like roses*) (e.g., **an environmental steward is like an earth angel)**

Analogy: 1.inference that if two or more things agree with one another in some respects they will probably agree in others. 2 a: resemblance in some particulars between things otherwise unlike : SIMILARITY **b:** comparison based on such resemblance **(e.g. environmental stewards count plants and animals in their environment over time the way accountants count and track money in bank accounts each month).**

Metaphor: a figure of speech in which a word or phrase literally denoting one kind of object or idea is used in place of another to suggest a likeness or analogy between them (as in *drowning in money*); **(e.g., An environmental steward is a tireless watchdog)**

Columbia River Watershed Stewardship

Subject: Stewardship

ELAR-GLE: **Component 3.2 Science, Technology, and Society**: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

3.2.4 Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

Duration: 30-40 minutes.

Location: School Site

When: Pre-visit One

Grade: 3rd-12th

Objectives: Students will be able to 1) identify what types of environmental stewardship are need in the Columbia River Watershed; 2) locate the Columbia River Watershed on a map; 3) identify ways humans use the Columbia River watershed.

Overview

Students will:

A. View the location and sizes of the Columbia & Lake Roosevelt Watersheds
B. Write from prior knowledge, view images, discuss benefits and issues, and begin to understand the River Mile Essential Question:
"How do we simultaneously use and protect our watershed"?

Materials: Stewardship Power Point slides 9-28, science journal, Background documents: FWEE: Columbia River Basin & LRF: Lake Roosevelt Fast Facts

---

Procedure:

Slide #9: Purpose: To access student's prior knowledge and conduct a quick informal assessment of the background student's bring to the lesson.

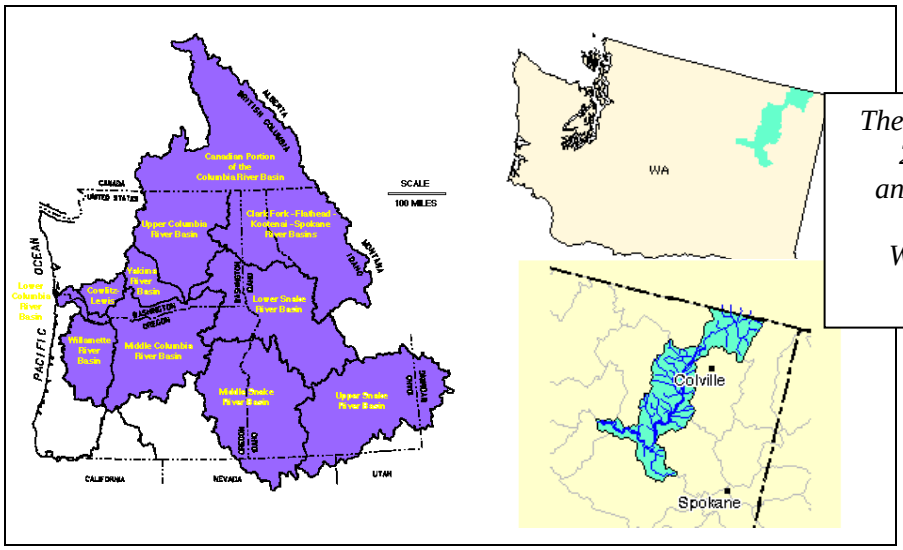
1. Ask students to quickwrite (3-5 minutes) in their science journals and respond to the question, **"What environmental stewardship is needed in the Columbia River Watershed"?**

2. Have students create categories and chart. (Option: Give students ten post-it notes. On each post-it record one way in which stewardship is needed. Chart the aspects mentioned along the "X" axis and create a bar graph using student

post-its across the "Y" axis to show the number of students who recorded the same issue.

Water pollution	
Forest fires	
Trash & litter	
Animal waste	
Spawning Grounds	
Loss of wet lands	

Slides #10 & 11 Introduce students to the size and location of the Columbia Watershed which includes your local watershed. Obtain a photo or map of your tributary watershed and share. Wikipedia has several nice ones and The River Mile's website has some you can use. www.nps.gov/laro/forteachers/theriver mile.html



The watershed covers nearly 260,000 square miles, an area the size of France

Wow what a huge area!

Slide #12: Guide students to write, share, compare, discuss and report the ways that people use the watershed. Chart the responses

EQ: How do relationships among components of an ecosystem in a watershed affect water quality?

1. In your science journal, make a list of all the ways people use rivers, lakes, and the natural environment (i.e., watershed)
2. Share and compare your list with a partner's list.
3. Discuss additional ways people use the natural resources
4. Add any new ideas to your list and prepare to report out.

Slides #13-17: Students view images of use for recreation, commerce, homes and communities, and human needs and compare their responses, adding any new ideas that they did not include prior to viewing the slides

Slide #18: ***As above,*** Guide students to write, share, compare, discuss and report the ways that people need to protect the watershed. Chart the responses

Slides #19-28: Students view images of the protection needed for our watersheds (e.g., animal waste, trash, invasive species, storm water runoff, fertilizers & pesticides, toxic chemicals, clear cut logging, forest fires, development of wetlands, spawning grounds for fish) and compare their responses, adding any new ideas that they did not include prior to viewing the slides

A Code of Conduct

Subject: Stewardship, codes of conduct, professionalism

ELAR-GLE: **Component 3.2 Science, Technology, and Society**: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

3.2.4 Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

Duration: 20-30 minutes

Location: Classroom

When: Pre Site Visit One

Grade: 3rd-12th

Objectives: Students will be able to 1) identify appropriate behavior as environmental stewards; and 2) comply with National Park Service rules.

Overview:

Students will: Reflect, discuss, analyze and synthesize information to co-develop an agreed upon code of conduct for participation in the River Mile Research Project and demonstrate understanding for why these agreements are valuable for valid science and the on-going health of the watershed.

Materials: Stewardship Power Point Slides # 29-34, Science Journal

---

Procedure:

Slide #29: Ask students to consider question 1 below by reflecting on your managing agency's missions and guidelines, our discussions of stewardship, the River Mile Essential Question, and the rules of behavior we use in the classroom.

Slide # 30: In the science journal, ask students to (2 below) make a list of the most important things to remember to guide our actions.

EQ: How do relationships among components of an ecosystem in a watershed affect water quality?

1. What code of conduct will we follow so that we are environmental stewards while we are researching and collecting data in the watershed?
2. Make a list of the most important things to remember that will guide our actions
3. Compare your list with the agency rules.

Slides #31-34 Ask students to read, discuss and compare your agency's rules to the lists of behaviors they wrote. You can use The River Mile Rules and Reminders, which were designed for National Park sites.

The River Mile Rules and Reminders

- WALK, leave no trace of your passing
- Stay with your group or working unit
- Follow directions of chaperones, teachers, and park rangers
- Keep voices to a normal talking level, loud noise will diminish animal sightings
- Do not gather plant or animal specimens, or parts thereof, without a research permit
- DO not disturb rocks or other archaeological materials. Moving things out of place destroys the story it tells. Take a photo or make a sketch of its location and tell the park ranger.
- Remove any litter
- No gum chewing, eating, or smoking during the site visit,
- Eat only at designated times and places
- Leave all radios, tape players, CD players, and games on the bus
- Use data collection instruments carefully
- Keep track of supplies, moving them with you as you go
- Remember to use all of your senses. Take time researching and collecting data so you identify and understand all the variables and characteristics of your "River Mile" research site.

Assessment: Direct students to use either expository writing or a three frame cartoon strip to explain why following an agreed upon code of behavior is important for the River Mile Research Project?